**REMARKS**

Claims 1-5 and 7-20 are pending in this application. By the Office Action, claims 1-5 and 7-20 are rejected. By this Amendment, claims 8, 9 and 14 are amended to correct formalities and thus, no new matter is added. In view of the amendments and the following remarks, reconsideration and allowance are respectfully requested.

**I. Rejection under §102**

The Office Action rejects claims 1, 3-5, 7, 11, 14 and 19 under 35 U.S.C. §102(b) over U.S. Patent No. 4,900,394 to Mankins ("Mankins"). Applicants respectfully traverse the rejection for at least the following reasons.

Claims 1, 3-5, 7, 11, 14 and 19 are drawn to an aluminum-free alloy composition including nickel and a further metal selected from the Transition Series of elements in Period VI of the Periodic Table of elements. Mankins does not teach such an alloy.

Mankins describes a process for producing single crystal nickel-based alloy that includes a single crystal seed. The disclosure is not directed to alloy compositions comprising nickel and a Period VI transition metal. Table II in Mankins lists alloy compositions reportedly satisfactory as alloy seed materials. The alloy ingredients include nickel, aluminum and fifteen other metals, including metals that are not from the Transition Series and/or metals that are not in Period VI. Table II also presents a broad range for each metal.

From among the possible alloy ingredients, the Mankins process reportedly brings about satisfactory nickel-based alloys using combinations of chromium (0-26 %), aluminum (0-10 %), titanium (0-10 %), molybdenum (0-15 %), tungsten (0-12 %), niobium (0-6 %), tantalum (0-12 %), carbon (0-0.3 %), zirconium (0-0.3 %), boron (0-5 %), cobalt (0-20 %), halfnium (0-3 %), rhenium (0-4 %), yttrium (0-1 %) and vanadium (0-2 %), with the balance essentially nickel. In Table II, there is no clear disclosure of the alloys of the present

invention. Mankins does not describe any particular alloy, much less any particular alloy within the terms of the present claims. However, it is clear that Mankins is concerned with the process details.

The Mankins process involves fusion welding a seed crystal to a mass of alloy and zone annealing to epitaxially grow a single crystal through the alloy mass. The Mankins process depends on exacting process details such as the individual "gamma phase lattice parameters" of the single crystal seed alloy (col. 2, lines 10-15) and zone annealing at specific temperatures in order to create a single crystal (col. 2, lines 19-26). Further important details described by Mankins are that,

> "(a) the fusion welding not totally destroy the single crystal character of the seed and (b) allowance should me made for discard of any portion of the dispersion strengthened alloy which may be deleteriously affected by the fusion welding process." (col. 2, lines 30-36).

Mankins then continues,

> "[I]n view of these important features, it is desirable to carry out fusion welding by a process such as autogenous flash welding in which fusion time is minimized, the fusion zone is minimized and relatively little metal is upset at the fusion joint." (col. 2, lines 36-41).

Thus in Table II, Mankins provides a list of potential metals to use in its process that could satisfy the criteria described above. In contrast to Mankins, claims 1, 3-5, 7, 11, 14 and 19, are drawn specifically to aluminum-free alloy compositions.

From the broad list of metals in Table II, Mankins does not teach or suggest the claimed aluminum-free single crystal seed alloy composition. In order to anticipate a claimed invention, it is not sufficient that each element merely be disclosed in the reference. Rather, the reference must disclose combining those separate components according to the claimed

invention. It is well established that a broad generic disclosure directed to a large number of compounds having uncommon properties, the majority of which do not embrace the claimed compounds, is not necessarily anticipatory. For instance, In re Petering, 301 F.2d 676, 681, 133 USPQ 275, 279 (CCPA 1962), the court held that "even though appellants' claimed compounds are encompassed by the broad generic disclosure, we do not think this disclosure by itself describes appellant's invention . . . within the meaning of 35 U.S.C. 102(b)." The court has also held that a reference does not anticipate where the reference does not highlight the claimed mixture among the many dozen disclosed, or suggest the claimed ratio, In re Kollman, 595 F.2d 48, 201 USPQ 193 (CCPA 1979), or where one skilled in the art would have to choose judiciously from a genus of possible combinations, In re Sivaramakrishnan, 673 F.2d 1382, 213 USPQ 441 (CCPA 1979).

More recently, the Patent Office acknowledged, in Ex parte Obukowicz, 27 USPQ2d 1063 (BPAI 1992), that prior art that gives only general guidance and is not specific as to the particular form of the claimed invention and how to achieve it cannot render it unpatentable. Finally, the Federal Circuit held in Ultradent Products, Inc. v. Life-Like Cosmetics, Inc., 127 F.3d 1065, 1071-72, 44 USPQ2d 1336, 1341-42 (Fed. Cir. 1997) that the disclosure of numerous possible combinations does not necessarily anticipate the claimed invention. The party alleging anticipation based on a range disclosed in a prior art reference must show that the reference describes to one skilled in the art a combination meeting the limitations of the claims from the many possible combinations described.

Mankins fails to teach an alloy combination falling within the scope of the claim, i.e., an aluminum-free alloy including 5-50 % Period VI transition metals. For instance, Mankins contains nothing that would teach holding aluminum at zero while raising the tantalum or tungsten to at least 5 %. As detailed above, Mankins is directed to a *process* for forming an alloy. However, Mankins fails to include a single example or embodiment having any

specific alloy composition, let alone an alloy with zero aluminum and 5-50 % Period VI transition metals as claimed.

For at least these reasons alone, Mankins does not teach and does not anticipate an aluminum-free alloy as claimed. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 3-5, 7, 11, 14 and 19.

## II. <u>Rejections under §103</u>

### A. Mankins and ASM

The Office Action rejects claims 2 and 8-10 under 35 U.S.C. §103(a) over Mankins in view of ASM Handbook Vol. 3 ("ASM"). Applicants respectfully traverse the rejection for at least the following reasons.

Claims 2 and 8-10 are directed to an aluminum-free alloy composition including features drawn to the solidification temperature and temperature range. The claimed alloy composition includes nickel and a further metal selected from the Transition Series of elements in Period VI, and zero aluminum.

The Office Action holds the position that the claimed alloy would inherently have the solidification temperature and temperature ranges as claimed, and relies on ASM as evidence to support this position. Regardless of whether the evidence of record supports this conclusion, ASM does not remedy the failed teachings of Mankins.

As detailed above, Mankins fails to teach, and also fails to suggest, an aluminum-free alloy composition including 5-50 % of the claimed transition metals. In fact, Mankins clearly teaches away from both an alloy containing zero percent aluminum and from an alloy containing 5-50 % transition metal.

#### 1. Mankins and ASM do not suggest an aluminum-free alloy

Mankins describes a process for producing a single crystal object from a gamma prime strengthened nickel-base alloy that requires very exacting process parameters. Table I

contains a listing of the gamma prime containing ODS nickel-base alloys that can potentially be used in its process. Mankins appears to consider aluminum and titanium to be interchangeable but provides no express explanation for including the two metals together. Accordingly, the ODS alloy must contain at least 5% aluminum and/or titanium, and preferably 6-9 %.

Crucial to the Mankins process is selecting a seed alloy composition with lattice parameters that closely match the lattice parameters of the ODS alloy (col. 3, lines 32-36). The seed alloy must also be characterized as being in the solid state at zone annealing temperatures (col. 3, lines 38-40). Table II contains a listing of the alloy seed materials that satisfy these limitations. Although, the seed alloy reportedly can contain 0-10 % aluminum and/or titanium it preferably contains 6-9 %. Mankins further discloses that "[S]eed 12 can of course be an ODS alloy, e.g., the same alloy which forms bar 11. Such a seed crystal 12 can be obtained by slicing a previously made single crystal bar." (col. 3, lines 29-32). Mankins thus teaches that the ODS alloy must contain aluminum, the seed alloy works well if it identically matches the ODS alloy, and that the seed alloy works best if it contains aluminum. For all of these reasons, Mankins teaches away from an aluminum-free alloy as claimed.

One of ordinary skill in the art would not have been motivated from the teachings or suggestions of Mankins to compose the claimed aluminum-free alloy. Likewise, ASM also does not provide any suggestion or motivation. For at least these reasons alone, Mankins and ASM would not have rendered obvious the alloy of claims 2 and 8-10 and the rejection should be withdrawn.

### 2. Mankins and ASM do not suggest 5-50 % Transition Series elements in Period VI

Mankins also describes in Tables I and II potential alloy compositions that contain not only a variety of elements exhibiting disparate chemical properties, but also teaches their use at a low percentage in the alloy composition. For example, the two Period VI transition

series metals, tungsten and tantalum, are preferred at 0-6 %. Thus, Mankins teaches away from an alloy containing the much higher 5-50 % claimed range of Transition Series metals in Period VI. One of ordinary skill in the art would have found no suggestion or motivation from Mankins, or from ASM, to include the higher claimed amount of metals in an aluminum-free alloy. For at least this reason alone, Mankins and ASM would not have rendered obvious the alloy composition of claims 2 and 8-10.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection.

**B. <u>Mankins and Yamazaki</u>**

The Office Action rejects claims 12 and 20 under 35 U.S.C. §103(a) over Mankins in view of U.S. Patent No. 4,707,192 to Yamazaki et al. ("Yamazaki"). Applicants respectfully traverse the rejection for the following reasons.

Claims 12 and 20 feature alloys having 13 to 40 % tungsten. As detailed above, and as recognized in the Office Action, Mankins does not teach an alloy having this amount of tungsten. The Office Action relies on Yamazaki to allegedly teach adding 7.5-20 % tungsten for increased strength. However, Yamazaki does not remedy Mankins' deficient teaching of an aluminum-free alloy.

The claimed "aluminum-free" alloy composition is nowhere taught or suggested in Yamazaki. In fact, the nickel-based composition disclosed in Yamazaki contains a substantial amount of aluminum (see, Abstract). There is no suggestion in Yamazaki to exclude aluminum from the composition. Moreover, Yamazaki teaches away from an aluminum-free alloy composition. Yamazaki discloses, at column 4, lines 7-10, that aluminum "is an element essential to the formation of the gamma prime phase, and in order to precipitate the gamma prime phase, it should be included in an amount of at least 4.5%."

Thus, for at least this reason alone, the combined teachings of Mankins, Yamazaki would not have rendered obvious the alloy composition of claims 12 and 20.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

### C. Mankins and Shankar

The Office Action rejects claims 15-17 under 35 U.S.C. §103(a) over Mankins in view of U.S. Patent No. 4,767,225 to Shankar et al. ("Shankar"). Applicants respectfully traverse the rejection for the following reasons.

Claims 15 is drawn to an alloy featuring 13-50 % tantalum; claims 16 and 17 depend from claim 15 and are drawn to embodiments have a narrowing range of tantalum. The Office Action recognizes that Mankins does not teach an aluminum-free alloy having this amount of tantalum and relies on Shankar for allegedly teaching the addition of up to 30% tantalum to an alloy for improving resistance to elevated temperature deformation. However, Shankar does not remedy Mankins' deficient teaching of an aluminum-free alloy.

As detailed above regarding the rejection of claims 12 and 20, claims 15-17 feature an aluminum-free alloy composition that is nowhere taught or suggested in Shankar. In fact, the nickel-based composition disclosed in Shankar contains a substantial amount of aluminum (see, Abstract). Moreover, there is no suggestion in Shankar to exclude aluminum from the composition. Shankar discloses, at column 4, lines 17-21, that the addition of aluminum to the alloy provides "oxidation resistance in high temperature environments." Shankar further states, at column 4, lines 25-27 that "[I]t is well known to those skilled in the art that aluminum, tungsten, ...serve as strong solid-solution strengtheners ..." Thus, for at least this reason alone, the combined teachings of Mankins and Shankar would not have rendered obvious the alloy composition of claims 15-17.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

**D. Mankins, Shankar and ASM**

The Office Action rejects claims 13 and 18 under 35 U.S.C. §103(a) over Mankins, in view of Shankar and ASM. Applicants respectfully traverse the rejection for the following reasons.

Claims 13 and 18 are drawn to an aluminum-free alloy that includes nickel and tantalum and features a solidification temperature of 1300-1400°C and a range not greater than 20°C. The Office Action states that Mankins and Shankar do not disclose the claimed solidification temperature features but that such properties are inherent as allegedly shown in ASM.

Regardless of any inherent properties that the claimed alloy compositions may possess, the fact remains that Mankins and Shankar do not teach or suggest an aluminum-free alloy composition as claimed. Furthermore, ASM does nothing to remedy this deficiency. Thus, the combined teachings of Mankins, Shankar and ASM would not have rendered obvious the alloy composition of claims 13 and 18.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

## III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-5 and 7-20 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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